

Joining Silicon Carbide Components for Space Propulsion, Phase I

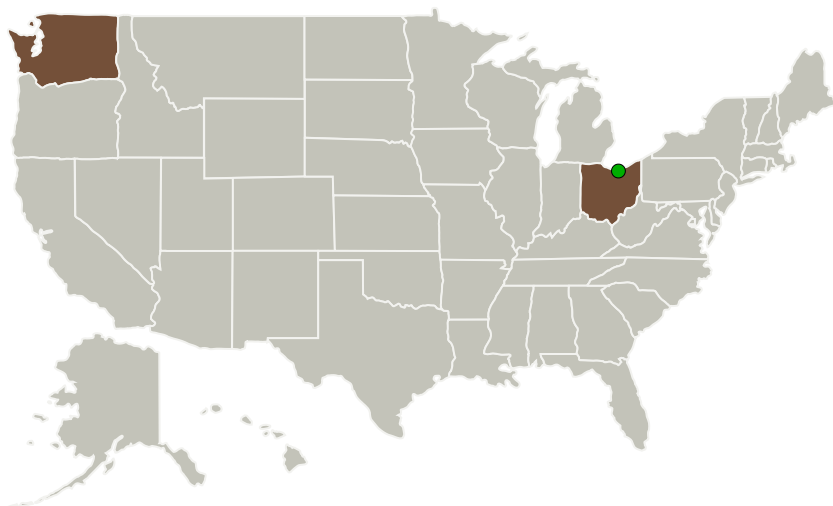
Completed Technology Project (2011 - 2011)




Project Introduction

This SBIR Phase I program will identify the joining materials and demonstrate the processes that are suited for construction of advanced ceramic matrix composite (CMC) thrusters for advanced monopropellants and bipropellants for space propulsion. We will join CMCs to each other and to superalloys by brazing. In Phase I, we will experimentally evaluate and identify suitable active metal braze alloys through wetting experiments, brazing, microstructural examination, and shear strength measurements both at room temperature and 1100°C. We will also demonstrate the feasibility of using stiff and compliant interlayers to increase the joint strength by reducing the thermal residual stresses in the joints. The Phase II project will demonstrate a working CMC HAN thruster using the joining technology developed in Phase I.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Sienna Technologies, Inc.	Lead Organization	Industry	Woodinville, Washington
 Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



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Primary U.S. Work Locations

Ohio

Washington

Project Transitions



February 2011: Project Start



September 2011: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138240>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sienna Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Ender Savrun

Co-Investigator:

Ender Savrun

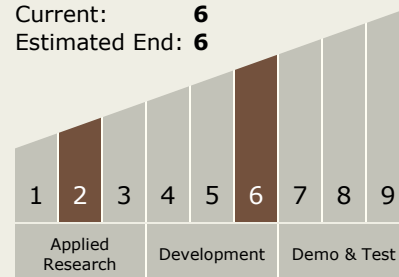
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Technology Maturity (TRL)

Start: **2**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.4 Advanced Electronic Parts

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System